



Office of Science Projects Perspective

Stephen W. Meador
Director
Office of Project Assessment



The Science Mission

SC delivers scientific discoveries and tools to transform our understanding of nature and advance the energy, economic, and national security of the U.S.

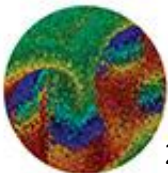
Science Serving
the Nation

Office of Science



U.S. DEPARTMENT OF
ENERGY

Office of
Science





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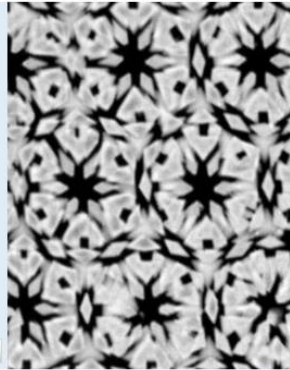


Results: <http://science.energy.gov/>

Most Complex Nanoparticle Crystal Ever Made By Design

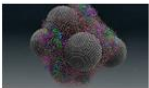
Possible applications include controlling light, capturing pollutants, and delivering therapeutics.

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Diamonds That Deliver

Neutrons, simulation analysis of tRNA-nanodiamond combo could transform drug delivery design principles. [Read More](#)



The Heat is On

X-rays reveal how simulated atmospheric entry conditions impact spacecraft shielding. [Read More](#)



For This Metal, Electricity Flows, But Not the Heat

Berkeley-led study finds law-breaking property in vanadium dioxide that could lead to applications in thermoelectrics, window coatings. [Read More](#)

University Research

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Quantum Computing in Infinite Dimensions
[Researchers at the University](#)



NYU Chemists Color World of 3D Crystals with Advances in Self-Assembly



Toward "Valleytronic" Devices for Data Storage or Computer Logic Systems

Science Headlines

The Life of an Accelerator

03.15.17 The world's longest linac located at the Department of Energy's SLAC National Accelerator Laboratory has undergone numerous changes in operation. Crews are in the process of replacing one-third of the original copper linac made of niobium.

[Read More](#)

Nidia Gallego: Carbon So Versatile as the Element

03.15.17 Working at the Department of Energy's Oak Ridge National Laboratory, carbon materials for energy technology exploration. She investigates chemical properties of carbon forms—including fiber, composite.

[Read More](#)

New 2-D Detector Promises Neutron Scattering Capabilities for WAND Users

03.13.17 The WAND instrument HB-2C, at Oak Ridge National Laboratory, is a state-of-the-art neutron scattering instrument.

BES User Facilities

X-Ray Light Sources

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The Basic Energy Sciences program supports the following X-Ray Light Source national scientific user facilities:



Advanced Light Source (ALS)

at Lawrence Berkeley National Laboratory

The ALS is one of the world's brightest sources of high-quality, reliable vacuum-ultraviolet light and soft X-rays, enabling a wide variety of scientific disciplines.



Advanced Photon Source (APS)

at Argonne National Laboratory

The APS is one of only four third-generation, hard x-ray synchrotron radiation light sources in the world, which has brought about new discoveries in a wide range of scientific fields.



Linac Coherent Light Source (LCLS)

at SLAC National Accelerator Laboratory

The LCLS is the world's first hard x-ray free electron laser facility capable of producing x-rays that are both very intense and clumped into ultrafast pulses.



National Synchrotron Light Source II (NSLS-II)

at Brookhaven National Laboratory

The NSLS-II is a state-of-the-art synchrotron light source which allows for scientists to probe the fundamental properties of matter, paving the way to new scientific discoveries and innovations.

FY 2016 28 user facilities



OLCF



ALCF



NERSC



ESnet



EMSL



ARM



JGI



SNS



HFIR



ALS



APS



LCLS



NSLS-II



SSRL



CFN



CINT



CNM



CNMS



TMF



DIII-D



NSTX-U



C-Mod



ATLAS



RHIC



FACET



ATF



Fermilab AC



CEBAF



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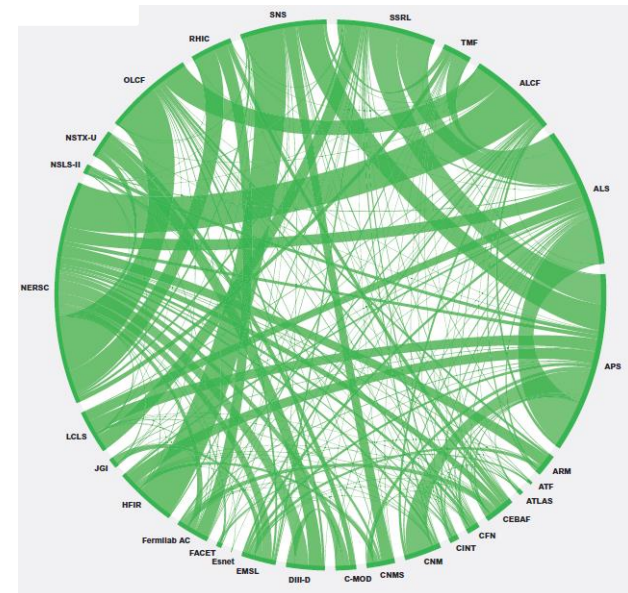
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New SC User Facilities Brochure



- Online at SC Homepage
<https://science.energy.gov/>
- Good introduction to SC User Facilities
- Insightful statistics for number and nature of academic, industrial and federal users

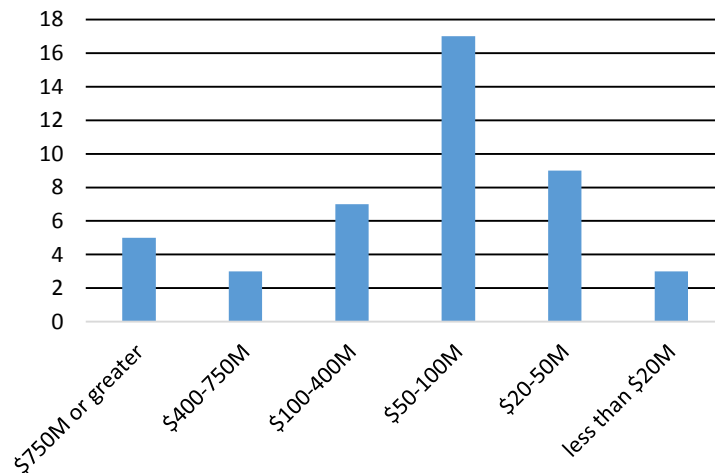




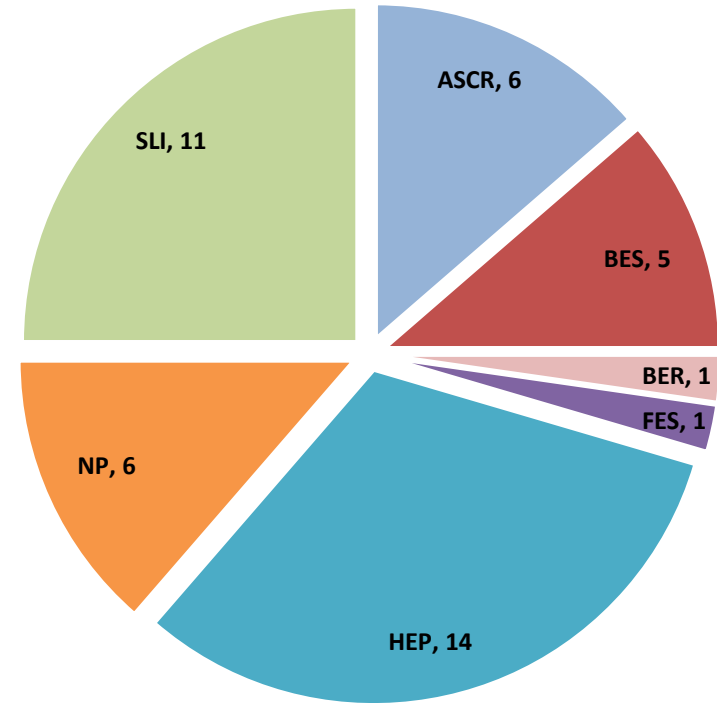
SC Project Portfolio

44 Active Projects

- Performance (O 413.3b projects only)
 - 16 projects are assessed as **Green**
 - 1 project is assessed as **Yellow**
(12 GeV Upgrade Project at TJNAF)
- Phase
 - 21 projects are post CD-2
 - 23 projects are pre-CD-2
- Scale (Total Project Cost)

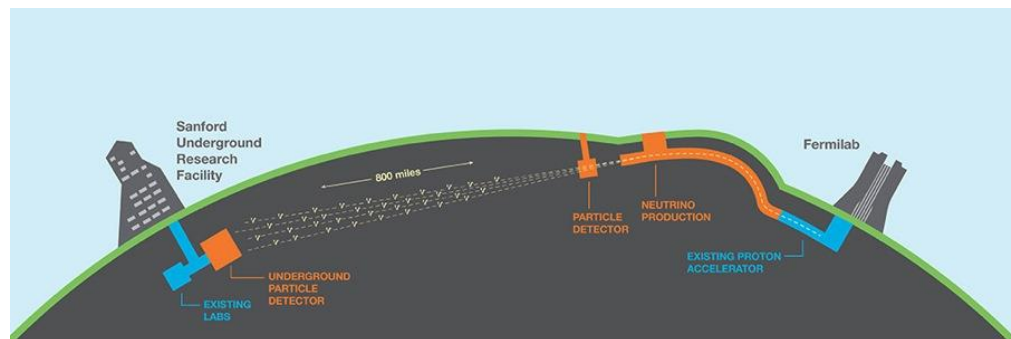


Number of Projects by Program

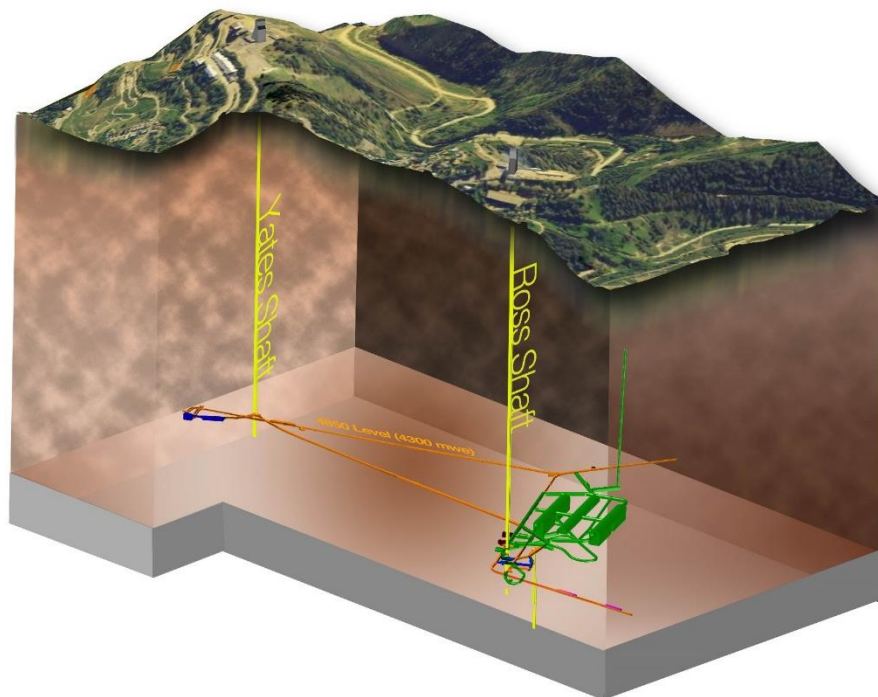


Long Baseline Neutrino Facility / Deep Underground Neutrino Experiment

- **LBNF** will build the world's most powerful neutrino beam at Fermilab, and shoot it 800 miles through the earth at neutrino detectors in South Dakota housed inside four 6 story tall, 70-yard-long x 20-yard-wide cryostats a mile underground that each contain 17,000 tons of liquid argon.



- **DUNE** will construct the neutrino detectors inside the four cryostats using cutting edge liquid argon time projection chamber technology.



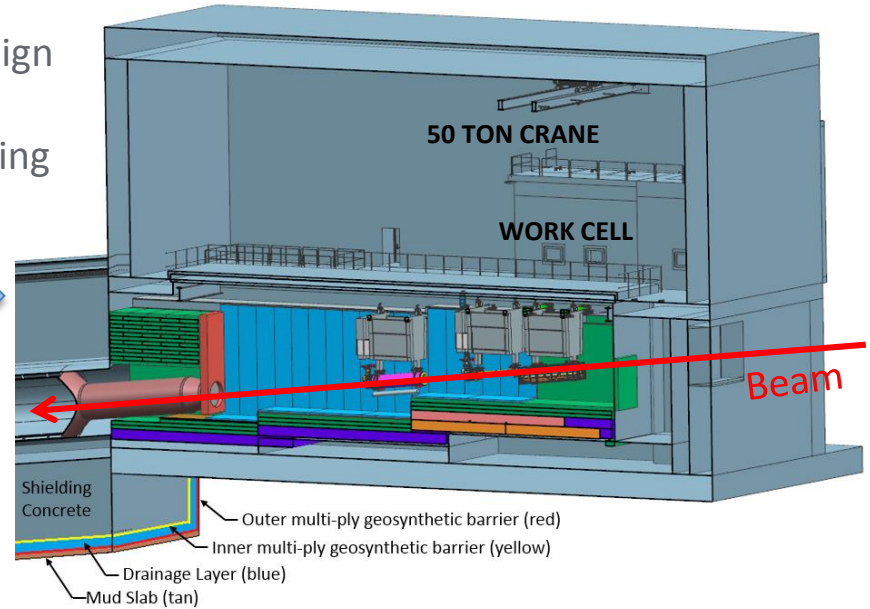
- The LBNF/DUNE-US DOE project received CD-3a milestone approval in Sept 2016 to start construction in South Dakota.
 - \$250 - \$350M Construction Manager/General Contractor (CM/GC) contract on track for June 2017 award. Will coordinate logistics and execute conventional facilities construction in South Dakota.
 - Construction/installation in South Dakota planned 2017 to 2026
 - Construction at Fermilab planned 2020 to 2026
- Project includes significant international in-kind contributions, led by CERN, which is building cryostat and detector engineering prototypes and the first full size cryostat in South Dakota.

LBNF/DUNE Activities Underway

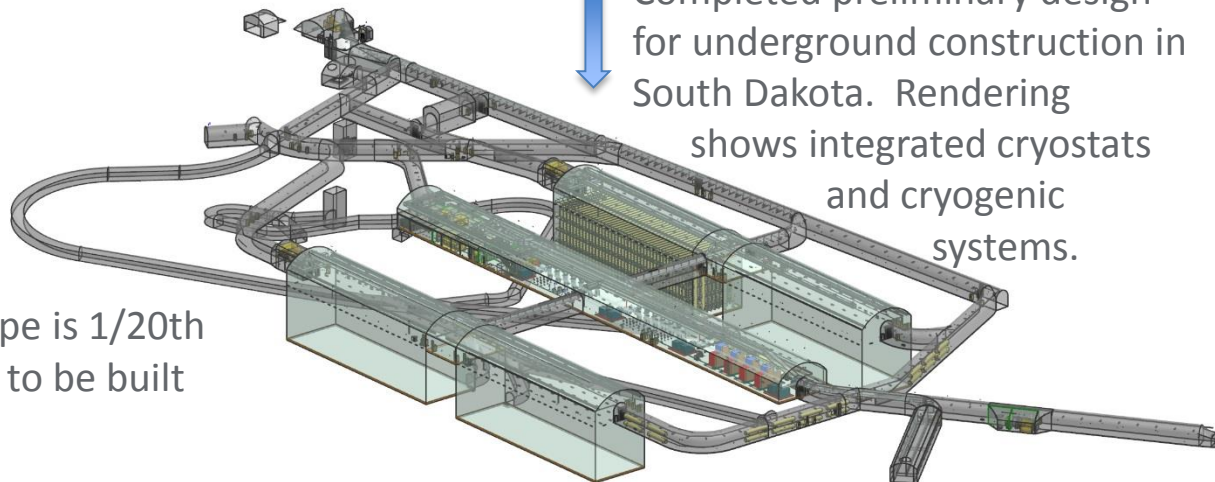


Construction of first of two "protoDUNE" cryostats and detectors at CERN. Each prototype is 1/20th the size of one the four modules to be built in South Dakota.

Conceptual design for optimized beamline showing three horns in target hall.



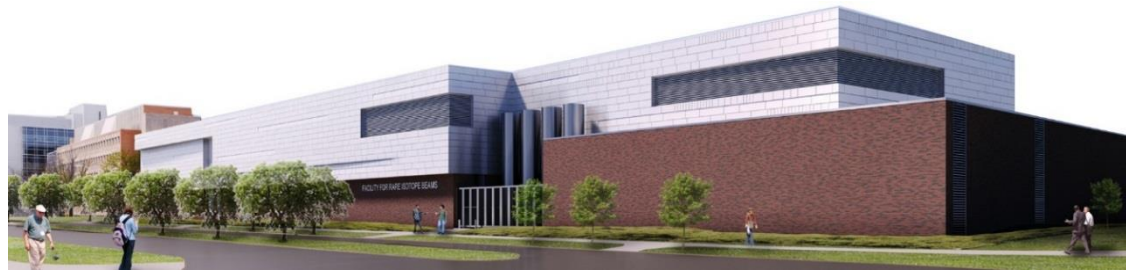
Completed preliminary design for underground construction in South Dakota. Rendering shows integrated cryostats and cryogenic systems.



Facility for Rare Isotope Beams

Beneficial Occupancy in March 2017

- FRIB will be a \$730 million national user facility funded by the Department of Energy, Michigan State University, and the State of Michigan
- FRIB Project completion date is June 2022, managing to an early completion in fiscal year 2021
- FRIB will serve as a DOE Office of Science national user facility for world-class rare isotope research, supporting the mission of the Office of Nuclear Physics in DOE-SC
- FRIB will enable scientists to make discoveries about the properties of these rare isotopes in order to better understand the physics of nuclei, nuclear astrophysics, fundamental interactions, and applications for society



Civil construction progress:

- Front-end building (where beam starts) turned over with conventional utilities operational in December 2016
- Civil construction tracking to beneficial occupancy in March 2017
- Photo shows FRIB construction site on February 13, 2017. Web cameras at frib.msu.edu/cameras

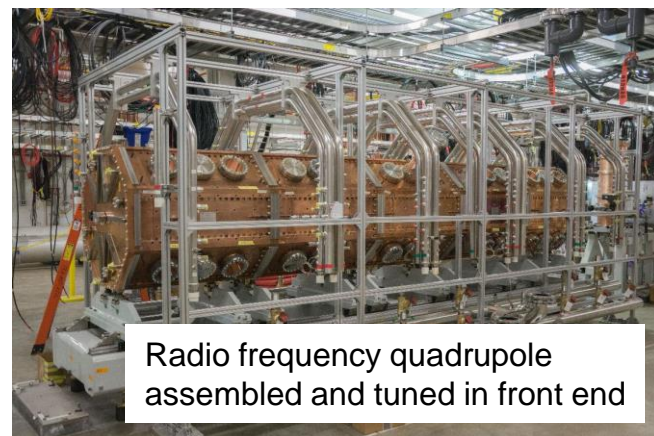
Technical Construction Underway



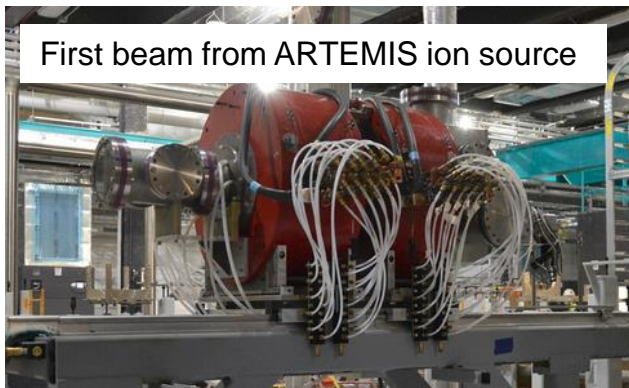
First of 48 cryomodules installed in linac tunnel



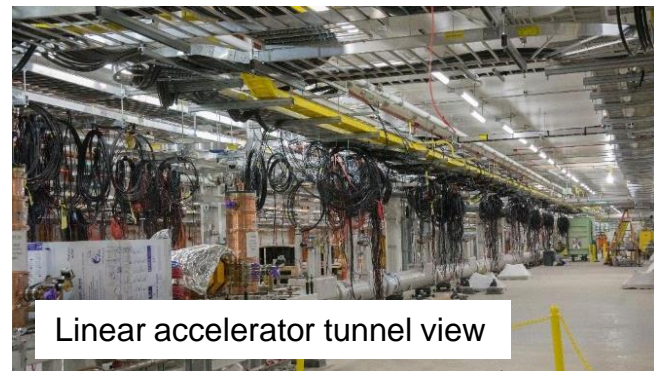
85,000-pound wedge vessel delivered, installed



Radio frequency quadrupole assembled and tuned in front end



First beam from ARTEMIS ion source



Linear accelerator tunnel view



Cryogenic cold boxes in cryoplant



Electrical panels in service building



Front-end building, high-voltage platforms

NSLS-II Producing High Impact Science

General User Operations

CSX-1, CSX-2, XPD, HXN, SRX,
IXS, CHX, LiX, AMX, FMX, ISS

Science Commissioning

XFP, TES, CMS

Technical Commissioning

ESM, ISR, SMI, NYX, SIX

Completion in FY17

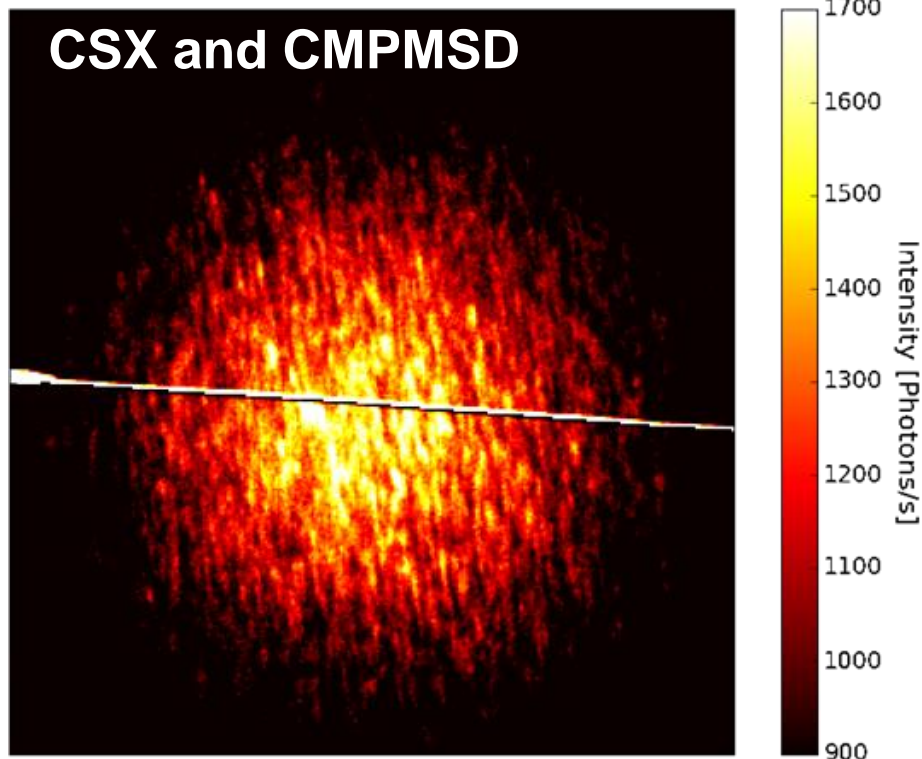
BMM, QAS, XFM

Completion in FY18

SST-1, SST-2, PDF, FXI, FIS,
MET

19 beamlines in operations
or commissioning

NSLS-II
ABBIX
NEXT
BDN
NPB



High coherent flux facilitated the
first ever speckle and XPCS measurement
of charge stripes in a cuprate
X.M. Chen, et al. PRL (2016)

NSLS-II

2016 PMI Project of the Year

CD-0 2005; CD-4 2015

TPC \$912M

Completed 6 months early

Added \$68M scope enhancements



DOE Project Leadership Institute – SC Pilot

Mission

- The mission of PLI is to cultivate a diverse network of successful DOE project delivery practitioners—those capable of delivering major high-risk projects.
- The PLI program participants will contribute to building a culture of project management excellence across DOE.

Approach

- Administered by SLAC utilizing Stanford’s Advanced Project Management coursework as a foundation.
- Provide the cohort participants with a prestigious, transformational professional development experience that is simultaneously both a leadership development and project delivery course of study and practice, tailored to the DOE context.
- The program will be designed to be rigorous and intensive.
- It will include experiential learning components and interaction with leaders from a variety of fields.

DOE Project Leadership Institute 2017 Cohort Program

2017 Cohort Program - 22 participants representing 13 organizations



- **Events:**

- | | | |
|-------------------------|-----------|--|
| 1. Jan. 9-12, 2017 | SLAC | <i>Preparing to Lead DOE Projects</i> |
| 2. Mar. 20- 23, 2017 | LLNL | <i>Becoming a Highly Effective Leader</i> |
| 3. Apr. 3- Jun. 6, 2017 | Online | <i>Leadership for Strategic Execution</i> |
| 4. May 15-18, 2017 | UCOLORADO | <i>Positioning the Project for Success</i> |
| 5. Sep. 11-14, 2017 | Argonne | <i>Delivering High Risk Complex Projects</i> |
| 6. Nov. 13-16, 2017 | DC | <i>Navigating to the Finish</i> |

- Selection of the 2018 Cohort will kick off in July 2017

DOE Project Leadership Institute Contacts

Contacts

Website: <https://pli-slac.stanford.edu>

PLI PROJECT LEADERSHIP INSTITUTE

U.S. DEPARTMENT OF **ENERGY**

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Learning Objectives

The PLI will promote the development of tools and informational resources that aid key participants in major projects.

Important Dates

Session #2 Becoming a Highly Effective Leader
MARCH 20, 2017 - 4:00PM

The U.S. Department of Energy (DOE) Project Leadership Institute (PLI) is a new program designed to cultivate a diverse network of successful DOE project delivery practitioners—those capable of delivering major high-risk projects. The PLI program participants will contribute to building a culture of project management excellence across DOE.

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